ON THE PSEUDO-GENUS *PSEUDOMARGINELLA*, v. MALTZAN

By the Rev. Dr. A. H. Cooke.

Read 11th November, 1921.

About forty years ago H. von Maltzan and J. Carrière published [1] certain papers proposing a new genus *Pseudomarginella* for mollusca possessing the shell, but not the animal, of *Marginella glabella*, L. The papers attracted attention [2] at the time from the remarkable nature of the conclusions drawn, which amounted to this, that we are not justified in concluding that similar shells are inhabited by similar animals, or, stated in the reverse way, that two animals of absolutely different anatomical construction may develop shells which are indistinguishable from one another.

We know, of course, that a limpet-like form of shell is developed by molluscs whose internal anatomy is widely different, and that snails whose soft parts are quite dissimilar may be protected by shells whose spire is similarly coiled. But does the evidence adduced by Von Maltzan and Carrière justify their conclusions in this particular case ?

In the bay formed by the Isle of Goree, off West Africa, in the latitude of the southern C. Verdes, Von Maltzan collected living shells of *Marginella glabella*, which he gave to Professor Schmidt of Strasburg, and Schmidt passed them on to Carrière (privatdocent of zoology in the University) for examination.

There were eleven shells in all, six of which, both in animal and shell, proved to be typical *M. glabella*. Of the remaining five, all of which possessed an operculum, which is quite unknown to *Marginella* proper, four had an operculum and radula (both figured), which suggested relationship with the " Buccinacea ", while the remaining *one* had an operculum and radula which suggested relationship to the " Purpuracea ". All five had the shell of a typical *M. glabella*, but their internal anatomy, so far as it was examined, differed utterly from that species.

Carrière, believing that the five last-mentioned specimens were genuine inhabitants of the *M. glabella* shells, and finding, too (as was not surprising), that they exhibited other points in anatomy differing from *M. glabella*, proposed the name of *Pseudomarginella leptopus* for the four specimens with a Buccinoid—he means unguiculate—operculum, the radula of which, according to Troschel, was closely

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[1] Nachr. Malak. Ges., xii, 1880, pp. 106–8 ; Zool. Anz., iii, 1880, pp. 637–41 ; Zeitschr. Wiss. Zool., xxxvii, 1882, pp. 99–120. I deal with Carrière's later paper, as being by far the most complete.

[2] The editors of the Journ. de Conchyl., xxviii, 1880, pp. 375–6, state that one of these operculate *Marginella* has been sent to them, and that they propose soon to figure the operculum and radula. I have failed to discover that they ever did so.

allied to that of "*Pisania fusiforme*". The single specimen, with purpuroid operculum and radula, he called *Ps. platypus*. He admitted that animals so different anatomically ought to be classified in different "families", not genera or species, but strangely kept the same generic name for them both.

Inspection of the excellent figures which accompany the description shows at once that the radula of the purpuroid species is that of *Thais hæmastoma*, L., which differs decisively from that of any other species of *Thais*.[1] *Th. hæmastoma* is a common West African species, occurring in almost every record of collections from Mossamedes to the Mediterranean. The radula of the other species is that of a *Pollia*, and corresponds exactly with that of *P. maculosa*, Lam., a specimen of which from the Cape Verdes is in the Gwatkin collection. This latter result somewhat surprises me, for *P. maculosa* usually possesses a shell too small to correspond in size with that of *M. glabella*: *P. variegata*, Gray, or *viverrata*, Kien., would have better fulfilled the condition of size, but the evidence of the radula is decisive. The operculum of the shells with the Pisania (*Pollia*) radula is that of *Pollia*, that of the shell with *Th. hæmastoma* radula is that of *Th. hæmastoma*. Both *Th. hæmastoma* and *P. maculosa* inhabit the rock-zone below high-water mark, where the *Pseudomarginella* are stated to have been found. The true *M. glabella* were dredged in about 30 metres bottom green mud. Carrière employs this difference of station to account for the divergence of the two sets of forms, but it may be doubted whether the argument has any weight.

Carrière seems scarcely to be aware of the *a priori* difficulty of the thesis which he maintains, or of the improbability, on the face of it, that three species of mollusca, which, as he admits, differ essentially from one another in the anatomy of the soft parts, should all be capable of secreting a precisely identical form of shell. It is true that he bravely attempts to meet the obvious suggestion that the negroes, who collected the shells for v. Maltzan, extracted the soft parts of other mollusca and inserted them into the empty shells of *M. glabella*. His honesty is indisputable, but it will require stronger evidence than he is able to produce in order to make us believe in phenomena which, if true, would revolutionize our theories of development, and throw the deductions of biology into confusion.

There are three points in which Carrière's own evidence tells fatally, as it seems to me, against him: (1) He says that the operculum of the *Pseudomarginella* prevented the animal from drawing itself completely into the shell, and it is obvious from his own figures that the operculum could not be withdrawn within the shell's mouth. He does not see that this is strong evidence that the animal does not

[1] Proc. Malac. Soc., xiii, 1919, p. 95, fig. xvi (p. 90).

belong to the shell at all. *Marginella* proper has no operculum; *Pseudomarginella* has two different opercula, the one unguiculate, the other horny, with a medio-lateral nucleus, and neither fits the mouth of the shell. (2) The polished surface of the shell of *M. glabella* is produced, as in *Cyprœa*, by extensions of the mantle-edge, which overlap and envelop the greater part of the shell. Carrière, in his notes on the anatomy, mentions their existence.[1] In the case of both his species of *Pseudomarginella*, he expressly records that there were no such prolongations of the mantle. But he does not seem to have asked himself how, in that case, the shell happens to carry a high surface-polish. He tells us that the five shells in question lived "in der felsigen Geröllzone nahe am Ufer", so that they cannot have developed their lustrous surface, as do many species of *Oliva*, *Mitra*, *Natica*, *Nassa*, etc., by ploughing about in wet sand. In the absence of either of these two conditions, the polish on the shells of *Pseudomarginella* remains unexplained. (3) He records, in the case of *M. glabella*, the fact that the four columella folds of the shell form strong indentations on the internal attachment muscle, as they do in all spiral shells furnished with similar folds. Carrière makes no such remark in discussing the anatomy of *Pseudomarginella*, except to say that the operculum prevented the complete retraction of the shell, and so made the indentations faint. Yet the columella folds continue to the top of the spire, and must have heavily indented any soft portion of a genuine animal which came in contact with them.

Before we can accept observations of the nature contained in these papers, or the theories built upon those observations, ample confirmation and illustration are required; neither are forthcoming. In the forty years which have since elapsed, nothing even remotely resembling the phenomena here recorded has been detected by observers, whose number has been multiplied by scores. It must follow, beyond a doubt, that in this case the observer was deceived; some mistake, it is both needless and impossible to determine its exact nature, must have occurred. The name *Pseudomarginella* must disappear from our catalogue of the mollusca.

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[1] "Bei dem lebenden Thiere umhüllt der Mantel mit seinen grossen Seitenlappen die Schale, wodurch die Glätte derselben hervorgerufen wird."